NEPTHYS MONS QUADRANGLE (V-54): PROGRESS REPORT FOR YEAR 1

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Work has begun on Nepthys Mons quadrangle (V-54), Venus. This quadrangle exhibits a complex assemblage of tectonic and volcanic features whose stratigraphic relations can only be deduced from detailed geologic mapping. Because this work is being filed in the midst of the first year of funding, only initial results can be reported, which are subject to revision as mapping progresses. Some important observations follow.

General Stratigraphy: Overall quadrangle stratigraphy is similar to that found for many other regions on Venus. Tessera, distributed as scattered inliers, appears to be the oldest unit and is truncated by tectonized plains, which are, in turn, truncated by untextured plains. Stratigraphically above these regional plains units are scattered fields of shields and associated flows (the position of these shield plains is in contrast to interpretations of other mappers who find them generally confined to the basal strata of plains). Flows associated with coronae and shield volcanoes cap the sequence. In all cases, craters appear to be younger than adjacent units, consistent with other areas on Venus. No craters occur on large shields.

Tessera and tectonized plains: As in other quadrangles, tessera is the oldest unit where stratigraphic relations are seen. Four units make up tessera and units associated with tessera: (1) Tessera blocks (t) are large areas of radar-bright, tectonized terrain that are not heavily embayed by lava flows. (2) Tessera-adjacent textured plains material (ptt) consists of plains that ramp up to tessera blocks and preserve some tessera fabric beneath a cover of dark plains material. It is interpreted as plains that have covered tessera prior to uplift centered on the adjacent tessera block. (3) Densely fractured plains (pdf) are somewhat tectonized and embay nearby tessera. (4) Intermixed tessera and plains (tp) is a new type of unit that I am proposing. In many areas of V-54 tessera ridges are separated by valleys filled with embayed plains material. The scale is such that mapping two units is difficult. Therefore, a combined unit, tp, is proposed to represent a region of tessera that is infilled on a small scale by plains.

Volcanic Features: All of the large volcanoes in the quadrangle share broad similarities in stratigraphy. The oldest material is generally made up of radar-dark flows. In most cases, it cannot be determined from initial mapping whether the flows represent pre-existing uplifted plains or lavas erupted from the volcano. Radial flows, which are generally radar bright, post-date these flows. Late stage volcanism, represented by small domes, cones, and pits, and possible pyroclastic deposits in the form of radar-bright regions, appear to occur after the radial flows, although in some cases the stratigraphy is difficult to interpret. The relations at Tefnut Mons indicate that regional extension, represented by fractures associated with Parga Chasma, occurred prior to the radial flows, at least in this one case.

The plains are rich in other types of volcanic features, reflecting a complex geologic history. At least fourteen fields of small shields can be identified. The shields are distinct from large shields elsewhere in the quadrangle, probably reflecting differences in magma supply and plumbing in non-extensional regimes. The shield fields and associated flows appear to be stratigraphically young, commonly truncating structural fabrics superposed on the regional plains. This is in contrast to many other areas on Venus, where shield fields are old and generally define the base volcanic unit. Four large and many small steep-sided domes occur

within the plains and are indicative of either silicic volcanism or basaltic volcanism at low extrusion rates. Radar-bright lava flows are common. Digitate flows adjacent to coronae are generally oriented radially, recording extensive volcanism occurring after the formation of the coronae topography.

A preliminary geologic map and images to support the map and the observations reported here will be presented.